LOCAL GROUNDWATER ASSISTANCE GRANT PROGRAM

APPLICATION

ATTACHMENT 4

PROJECT DESCRIPTION

UPPER SAN GABRIEL VALLEY
MUNICIPAL WATER DISTRICT

UPPER DISTRICT GROUNDWATER REPLENISHMENT MODEL

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Attachment 4 **Project Description**

The Upper District will develop a site-specific GSFlow[1] or MODFLOW-2005[2] model to support the design, regulatory permitting, and management of a proposed groundwater recharge project in the Main San Gabriel Groundwater Basin (Basin) that will utilize recycled water. The proposed project is referred to as the Indirect Reuse Replenishment Project (IRRP). The project recharge areas are near the Santa Fe Dam in the San Gabriel Valley. The locations of the proposed IRRP facilities are shown in Figure 1. The groundwater replenishment model that will be developed will focus on the hydrogeologic setting of the proposed IRRP area, and encompass approximately 50 square miles of the Basin. This model will be a sub-region (Figure 2) of, and build upon, the existing regional two-dimensional PLASM[3] model that has been supporting the activities of the Main San Gabriel Basin Watermaster for more than 15 years.

This modeling project will directly support the IRRP. The purpose of the IRRP is to increase the reliability of supplemental replenishment water as required for management of the Basin under the terms of the adjudication of the water rights in the Basin. The three-dimensional numerical groundwater model developed with this grant funding will be used to evaluate the potential to deliver tertiary-treated wastewater or advanced-treated wastewater for groundwater recharge. The model will simulate baseline and management scenarios that account for the project's beneficial use of recycled water, as well as providing information necessary to show regulatory compliance with requirements for subsurface retention time along pathways to the closest existing potable production wells and maintaining a safety factor for public health.

[1] U.S. Geological Survey, 2008; Coupled Ground-Water and Surface-Water Flow Model based on the integration of the precipitation-runoff modeling system (PRMS) and MODFLOW-2005.
[2] U.S. Geological Survey, 2005. Modular three-dimensional finite difference groundwater flow model.
[3] Pricket-Lonnquist Aquifer Simulation Model two-dimensional finite difference groundwater flow model.

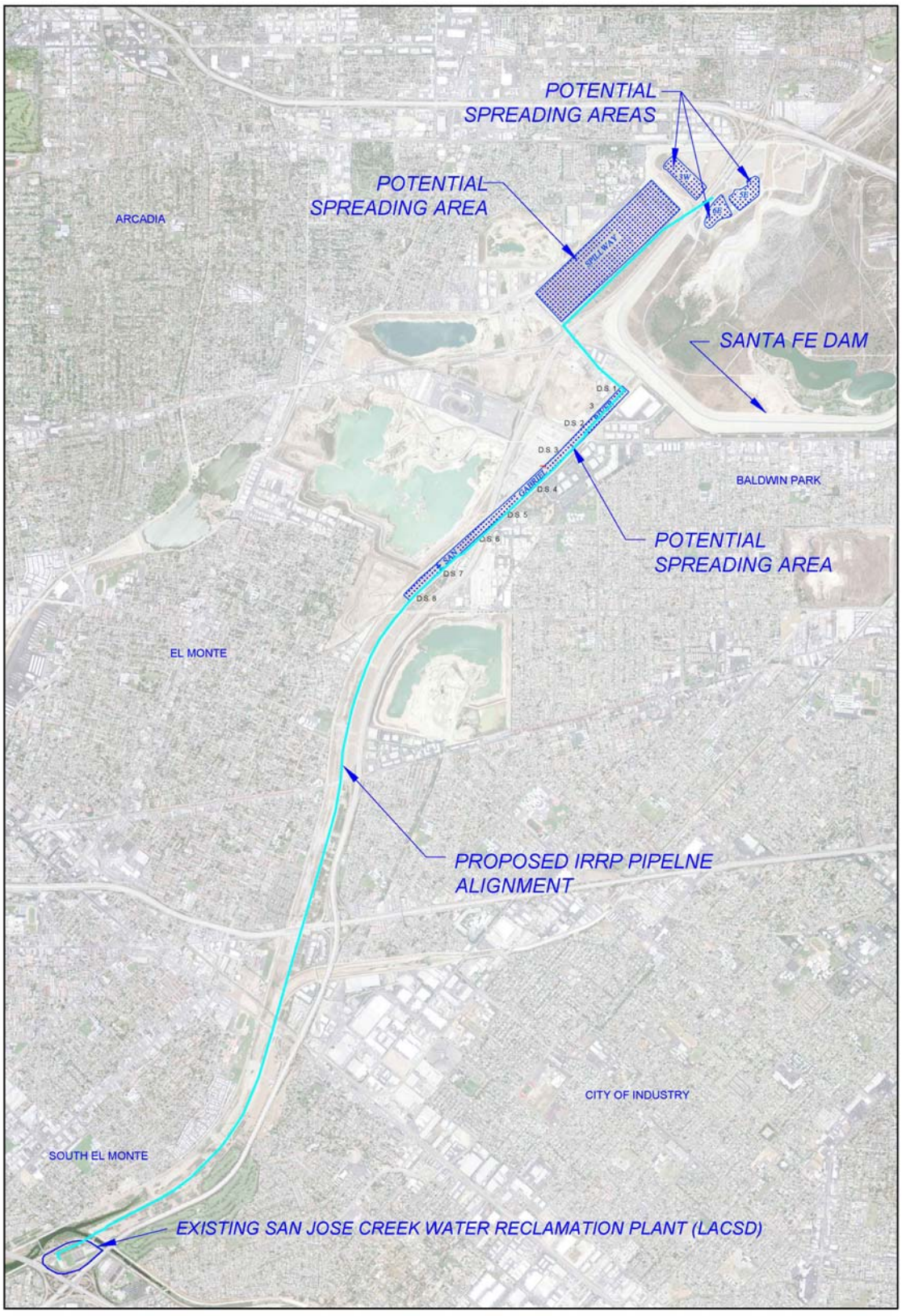

Figure 1. Potential Project Alignment and Recharge Areas

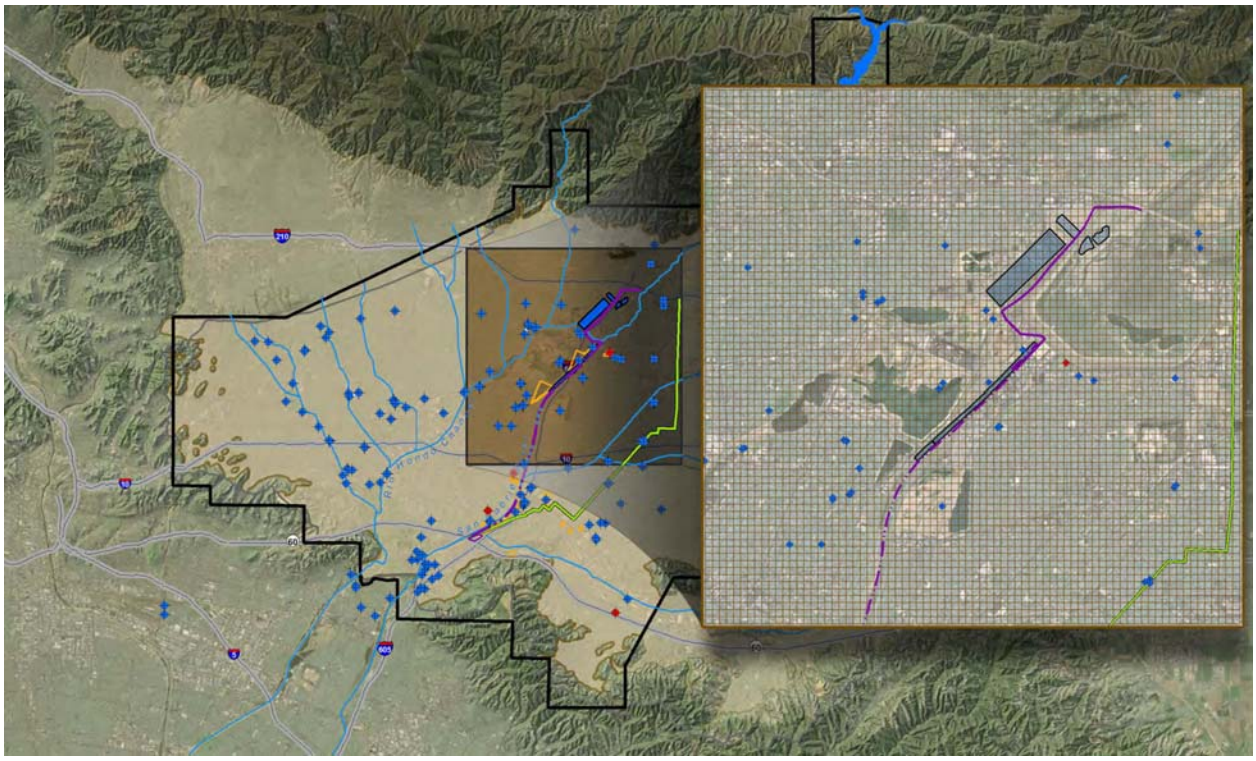

Figure 2. Proposed Groundwater Replenishment Model Extent

In 1973 Judgment No. 924128 of the Superior Court of Los Angeles County (Judgment) adjudicated Basin water rights and established the frame work for Basin management. The Judgment allows pumping of groundwater above the natural safe yield of the Basin. Management of the Basin is predicated on the long-term reliable supply of Supplemental Water for groundwater recharge to replace groundwater that is produced above the natural safe yield of the basin. Upper District is identified win the Judgment as a "Responsible Agency" for the delivery of Supplemental Water to replenish the Main Basin. Supplemental water is water defined as "non tributary water imported through Responsible Agency and reclaimed water".

Recycled, or reclaimed water, has not historically been available to recharge the basin so the obligation to provide Supplemental Water has been met with imported water purchased by Upper District from the Metropolitan Water District of Southern California. Imported water has recently become unreliable (the availability of imported

replenishment water was suspended by MWD from 2007 to 2011), due to drought and environmental concerns. The unreliability of imported water threatens to disrupt the management of the Basin as established by the Judgment. The IRRP will be a drought proof supply of Supplemental Water that will allow Upper District to reliably meet its responsibility under the Judgment.

The groundwater replenishment model will evaluate the IRRP along the San Gabriel River recharge area and the Santa Fe Spreading Grounds and be used in the regulatory permitting process. The model will be developed to assess the IRRP under the recently released California Department of Health (CDPH) Draft Regulations[4] for Groundwater Replenishment Reuse Projects (GRRP). Model development will include the hydrogeological assessment of the proposed GRRP setting[5] required in the draft regulations. Monthly stress periods throughout a balanced hydrologic period will provide project evaluation under different seasonal and annual hydrologic conditions. The calibrated finite difference numerical[6] model will estimate the retention time of the recycled water to the nearest downgradient drinking water well. Management scenarios will be developed and compared for the optimal recycled water use for the variability of hydrologic conditions[7].

This modeling project will focus on the actively managed recharge area within the Basin, and encompass approximately 50 square miles of the Basin. This model will be a sub-region of, and build upon, the existing regional two-dimensional PLASM model that encompasses approximately 170 square miles. The existing steady state regional model simulates current and future groundwater levels based on average annual groundwater production and recharge. The proposed transient GS-Flow or MODFLOW-2005 groundwater model will incorporate refined hydrogeologic features into a sub-

[4] CDPH, November 21, 2011; *Groundwater Replenishment Reuse Draft Regulation*; Title 22, California Code of Regulations.
[5] CDPH, 2011 draft; CCR Title 22, Section 60320.100 (h) hydrogeological assessment.
[6] CDPH, 2011 draft; CCR Title 22, Section 60320.108; (f, g, h) and Table 60320.108 Method used to estimate the retention time to nearest downgradient drinking water well.
[7] CDPH, 2011 draft; CCR Title 22, Section 60320.108 (i) changes in hydrogeological or climatic conditions.

region of the existing PLASM model, and account for seasonal changes in groundwater production and natural and/or induced recharge.

The groundwater replenishment model will be developed through a step-wise process that includes hydrogeological refinement to the geometry of the Basin's geologic structure. The identification and refinement of the geologic structure assures physical processes that control the movement of water are accurately depicted. Understanding of these processes will be used to develop a conceptual model that includes a preliminary water budget to assure all water sources and sinks are accounted for prior to numerical modeling. The first step in developing the numerical groundwater replenishment model will be to perform a steady-state model run to verify the hydrogeologic parameters and physical processes identified in the Conceptual Model. Once the steady-state model is verified, transient simulations of historical datasets will be used to assess the model's ability to simulate various flow and contaminant movement through the study area. Baseline and future management scenarios will be evaluated using the calibrated model.

The development of the IRRP will be a multiyear process that will include outreach and collaboration with numerous stakeholders. The development and application of the groundwater replenishment model will be included in those outreach and collaboration activities. Upper District holds regular Water Producers Workshops with the public and private water producers in the Basin. Upper District also gives regular briefings to the CDPH and the Los Angeles County Sanitation Districts (producer of the tertiary treated water that will be used in the IRRP) on the status of IRRP activities. A public outreach program is planned as part of the implementation of the IRRP.

The ongoing maintenance and use of the groundwater replenishment model will be funded by Upper District initially from revenue from the sale of imported water and in the long term from revenue from the sale of recycled water from the IRRP.

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